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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/602,957	06/24/2003	Jung Ho Ma	CU-3270 RJS	1220

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EXAMINER	
SCHECHTER, ANDREW M	

ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 04/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/602,957	MA ET AL.	
	Examiner	Art Unit	
	Andrew Schechter	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 January 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,5 and 7-11* is/are rejected.

7)☒ Claim(s) *2-4 and 6* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 January 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The proposed drawings were received on 18 January 2005. These proposed drawings are acceptable.

Claim Objections

2. Claim 6 is objected to because of the following informalities: "the hole is positioned at both of a concave portion and a convex portion of the jagged pixel electrode" should be "the hole is positioned at a concave portion and another such hole is positioned at a convex portion of the jagged pixel electrode" to make clear that they are not the same hole [compare Fig. 9]. Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 7, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Kim et al.,* U.S. Patent No. 6,570,636 in view of *Kim et al.,* U.S. Patent No. 6,567,144, and further in view of *Kataoka et al.,* "39.4: A New MVA-LCD with Jagged Shaped Pixel Electrodes", SID Digest 2001, pp. 1066-1069.

Kim '636 discloses [see Fig. 2, for instance] a vertical alignment mode LCD which comprises upper and lower substrates and liquid crystal between them, an insulating film [14] on the inner surface of the lower substrate and having a hole [around P1, for instance] therein, a pixel electrode [11] formed on the insulating film, wherein the pixel electrode partially but not completely covers the hole [see Fig. 2], and a counter electrode [21] which is formed on the inner surface of the upper substrate.

Kim '636 does not explicitly disclose that the liquid crystal has negative dielectric anisotropy, that there are vertical alignment films as recited, and that there are polarizers with crossed axes as recited. *Kim '144* discloses an analogous vertical alignment LCD, and does explicitly disclose the liquid crystal having negative dielectric anisotropy [col. 4, line 11, for instance], vertical alignment films [15, 25] as recited, and crossed polarizers [16, 26] as recited. It would have been obvious to one of ordinary skill in the art at the time of the invention to have these components, motivated by the desire to initially orient the liquid crystal molecules appropriately, have them respond to electric fields appropriately, and provide and analyze the polarized light appropriately in order to provide a working display.

Kim' 636 does not disclose the pixel electrode being jagged. *Kataoka* discloses [see Fig. 4] a jagged pixel electrode and teaches its use in an analogous LCD. It would have been obvious to one of ordinary skill in the art at the time of the invention to use such a jagged pixel electrode in the device of *Kim*, motivated by *Kataoka's* teaching that these jagged pixel electrodes provide fast gray-scale response characteristics while keeping other advantageous characteristics the same [see abstract].

Claim 1 is therefore unpatentable.

Kim '144 also discloses phase compensation plates [41, 42] between the substrates and the polarizers; it would have been obvious to one of ordinary skill in the art at the time of the invention to use such compensation plates, motivated by the desire to improve the display quality by compensating for the retardation of the liquid crystal and other effects. Claim 7 is therefore unpatentable. The liquid crystal layer comes into contact with the lower substrate through the uncovered portion of the hole [see Fig. 2 of *Kim '636*], so claim 11 is also unpatentable.

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Kim '636, Kim '144,* and *Kataoka* as applied to claim 1 above, and further in view of *Shimada et al.,* U.S. Patent No. 6,147,722 and *Yasukawa,* U.S. Patent No. 6,344,888.

The interval between adjacent pixels being less than 10 μm is not explicitly disclosed. *Shimada* discloses pixel electrodes which are "typically 5 μm" apart [col. 16, lines 24-27] and *Yasukawa* discloses pixel electrodes which are "in close proximity to the adjacent pixel electrode... for example, 1 μm, so as to decrease the light leaked between the pixel electrodes as much as possible" [col. 10, lines 40-44]. It would therefore have been obvious to one of ordinary skill in the art at the time of the invention to make the interval less than 10 μm, motivated by the above teaching of *Yasukawa*. Claim 5 is therefore unpatentable.

6. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Kim '636, Kim '144,* and *Kataoka* as applied to claim 7 above, as applied to claim 7 above, and further in view of *Terashita et al.,* U.S. Patent No. 6,512,561.

Kim '144 discloses using monoaxial or biaxial phase compensation plates [col. 7, lines 2-13], but is silent on the phase delay value in either case. *Terashita* discloses [col. 12, lines 20-52] using two monoaxial (uniaxial) phase compensation plates in an analogous LCD and having the phase delay value set to 175 nm, within the recited range. It would have been obvious to one of ordinary skill in the art at the time of the invention to do so in the above device, motivated by *Terashita's* teaching that optimizing the phase delay value in this way reduces light leakage in an inclined direction and produces a better display. Claim 8 is therefore unpatentable.

7. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Kim '636, Kim '144,* and *Kataoka* as applied to claim 1 above, and further in view of *Arakawa et al.,* U.S. Patent No. 6,621,550.

The above references appear to be silent on the value of the dielectric anisotropy. *Arakawa* discloses, for an analogous vertically aligned LCD, having the dielectric anisotropy range from –2 to –10. It would have been obvious to one of ordinary skill in the art at the time of the invention to do so in the device of *Sasaki*, motivated by *Arakawa's* teaching that if the value is closer to zero than –2, the threshold voltage required to drive the device increases undesirably, and that there are no practical liquid crystals having a value greater than –10 [col.2, lines 27-59]. Claim 9 is therefore unpatentable.

8. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Kim '636, Kim '144,* and *Kataoka* as applied to claim 1 above, and further in view of *Yamada et al.,* U.S. Patent No. 6,466,296.

The above references appear to be silent on the value of the thickness and refractive index anisotropy. *Yamada* discloses, for an analogous vertically aligned LCD, having the liquid crystal thickness about 6 μm and the refractive index anisotropy 0.08, so that the product is 480 nm, within the range recited. It would have been obvious to one of ordinary skill in the art at the time of the invention to use these values in the above device, motivated by *Yamada*'s teaching that doing so obtains a retardation giving a satisfactory contrast [col. 8, lines 21-25]. Claim 10 is therefore unpatentable.

Allowable Subject Matter

9. Claims 2-4 and 6 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter:

The prior art does not disclose the device of claim 2, in particular the limitation that the hole is a rectangular hole (in combination with the amended limitation in claim 1 that the pixel electrode partially but not completely covers the hole, which excludes contact holes like that in *Hatano*). For instance, *Kim '636* is silent on the shape of the hole, and apparently analogous holes in U.S. Patent No. 6,600,539 to *Song* [see Figs. 4 and 5] and in U.S. Patent No. 6,657,695 to *Song et al.* [see Fig. 7] are not rectangular. Claim 2 would therefore be allowable if rewritten appropriately, as would its dependent claim 3.

The prior art does not disclose the device of claim 4, in particular the additional limitation that the ratio of the portion of the hole covered to the portion uncovered is between 1:1 and 5:1. Again, *Kim '636* is silent on this limitation, and there is no teaching in the prior art to suggest doing so. Claim 4 would therefore be allowable if rewritten appropriately.

The prior art does not disclose the device of claim 6, in particular the additional limitation that the hole is positioned at both a concave portion and a convex portion of the jagged pixel electrode. Claim 6 would therefore be allowable if rewritten appropriately. (Also note the objection to minor informalities in claim 6 above.)

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Schechter whose telephone number is (571) 272-2302. The examiner can normally be reached on Monday - Friday, 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Andrew Schechter
Patent Examiner
Technology Center 2800
15 April 2005